TEST APPARATUS FOR AUTOMOTIVE IGNITION DISTRIBUTOR.

State of the Art.

The present invention is based on test apparatus for automotive ignition distributors of the kind defined in the main claim. As regards test apparatus known heretofore, the ignition voltage of the ignition coils mounted in the ignition distributor housing is capacitively picked up by means of various adapter plates. However different shapes of ignition distributor housings are used for each vehicle. Accordingly many adapter plates must be used. On the other hand, if adapter plates applicable to several housings are used, capacitive pickup no longer will be optimal. The spacing between the ignition coils and the adapter plates no longer is minimum and therefore measurement sensitivity is degraded.

Also test apparatus are known where the ignition coils are configured outside the ignition distributor housing. These apparatus allow picking up the ignition voltage at the connection site of the coils to the distributor using clip-on elements.

Advantages of the Present Invention.

The test apparatus of the present invention exhibiting the features of the independent claim does on the other hand offer the advantage that the ignition voltage may be picked up in relatively accurate capacitive manner for almost all ignition distributor housings. The cable can be matched to arbitrary housing shapes. Especially easy handling is assured when using looping cables. A looping cable automatically matches the housing shape and, on account of its resiliency, always rests directly against the housing. As a result minimum spacing between the ignition coils and the looping cable will always be assured and the sensitivity of measurement always shall be very high. Pickup also is feasible where access to the ignition distributor is difficult. Routine operations of the test apparatus of the invention are comparative measurements of the ignition voltages of the particular internal combustion engine cylinders. Using prior calibrations, absolute ignition voltage also may be inferred.

The designs cited in the dependent claims improve and develop further the test apparatus defined in the independent claim.

Drawings

An illustrative embodiment mode of the present invention is shown in the appended drawing and elucidated in the subsequent discussion.

Fig. 1 is a simplified view of the test apparatus of the invention,

Fig. 2 is a looping cable with a connector element, and

Fig. 3 is a cable fitted with a resilient insert.

Discussion of Embodiment Mode.

Fig. 1 shows the housing 10 of an automotive ignition distributor receiving the ignition coils 11. Conductors 12 run in known manner from the said distributor to the internal combustion engine cylinders. A looping cable 13 is wound around the housing 10 and capacitvely picks up the ignition voltage of the ignition coils 11. The spacing between the ignition coils 11 and the looping cable 13 determines the measurement capacity and the measurement sensitivity of this apparatus. As shown by Fig. 2, the looping cable 13 is fitted at one end with a connector element 14 to hook up to an engine test equipment 15, The other end of the looping cable 13 may comprise a hook 16 by means of which it may be suspended into the turns of the looping cable 13. In this manner the looping cable 13 may always be mounted to rest directly against the outer wall of the housing 10 and running around it. Because the looping cable 13 may stretch, that is, because it is resilient, the least possible spacing between the ignition coils 11 and itself shall be attained. This spacing is significant for capacitively picking up the ignition voltage both as regards the measured capacity and the sensitivity of measurement. In this configuration the ignition coils 11 and the looping cable 13 act like the two plates of a [parallel plate] capacitor. Contrary to the case of the heretofore known adaptor plate, the looping cable 13 of the present invention no longer is affected by a particular shape. The looping cable 13 is fitted with a highly electrically conducting core 17 enclosed by a plastic insulator. The length of

the looping cable 13 may be adjusted to a length which corresponds to almost all types of [distributor] housings. In this manner the looping cable 13 and hence the test apparatus are nearly universally applicable. Thus the ignition voltage may be picked up even at ignition distributors of difficult accessibility.

The looping cable 13 allows capacitively picking up the ignition voltages of the internal combustion engine's individual cylinders. The signals ascertained and measured in this manner allow relative comparison of these cylinders. The ignition voltages of such individual cylinders can be determined using appropriate calibrations.

As shown in Fig. 3, a plain cable 20 may be used also in lieu of a looping cable. Such a design variation however requires an easily closed lock element 21 at the end of the cable 20. A so-called adhesion or velcro lock may be used for such a purpose. To allow using the cable 20 with different types of ignition distributor housings, however, the lock 21 must comprise a larger overlap zone 22. Moreover an elastomeric segment or a spring 23 may be configured in a zone of the cable 20. As a result the cable 20m will rest snugly against the housing 10. Still, the cable 20 may be slightly away from the housing in the region of the spring 23.